FEDERAL PUBLIC SERVICE COMMISSION

COMPETITIVE EXAMINATION FOR RECRUITMENT TO POSTS IN PBS-17, UNDER THE FEDERAL GOVERNMENT, 2002

## COMPUTER SCIENCE

**TIME ALLOWED: THREE HOURS** **MAXIMUM MARKS: 100**

**NOTE:**
1) Attempt **FIVE** questions in all, including **QUESTION NO. 8** which is **COMPULSORY**. Select at least **ONE** question from each of the **SECTIONS A, B and C.** All questions carry **EQUAL** marks.
2) Illustrate your answers with diagrams and sketches wherever necessary.
3) Answers should be neat, clean and to the point. Avoid unnecessary details but record facts and any assumptions made.

### SECTION – A

1. (a) Differentiate between CISC and RISC computer architectures and in this context, describe the architecture of a Stack Machine? **(10)**
   (b) Define a process and process control block. Draw a 5-state model for the process state transition and explain it? **(10)**

2. (a) Define a parallel computer and describe the Flynn's Taxonomy to characterize the various parallel computer architectures? **(10)**
   (b) Differentiate between the paging and segmentation? And describe the working of Page-Fault Frequency Algorithm? **(10)**

3. (a) Describe the TCP/IP and explain the concept of TCP/IP ports. Also describe the functionality of at least two well-known protocol ports. **(10)**
   (b) What is the OSI model? Name various OSI layers and briefly describe their functionality. **(10)**

### SECTION – B

4. (a) Write an algorithm to construct the binary tree with given preorder and inorder sequence? Prove that every binary tree is uniquely defined by its preorder and inorder sequence? **(10)**
   (b) Provide five examples of software development projects that would be amenable to prototyping, name two or three applications that would be more difficult to prototype? **(10)**

5. (a) Briefly construct various Software Development Life Cycle models and their effectiveness in appropriate situations. **(10)**
   (b) Write notes on: **(10)**
      i. Parameter Passing in C++
      ii. C++ operator associations and order of precedence
      iii. C++ structures and classes.

### SECTION – C

6. (a) Describe the Besenham's Line algorithm for raster devices and implement it in C++ **(10)**
   (b) Differentiate between DDL, DML, DCL and give examples. **(10)**

7. (a) Consider the following relations and identify the highest normal form of each, as given, stating any assumption that you need to make. **(10)**
      1) WORK1 (EMPID, EMPNAME, DATE_HIRED, JOB_TITLE, JOB_LEVEL)
      2) WORK2 (EMPID, EMPNAME,JOB_TITLE,RATING_DATE, RATER_NAME, RATING)

3) WORK3 (EMPID, EMPNAME, PROJECT#,PROJECT_NAME, PROJ_BUDGET, EMP_MANA HOURS_ASSIGNED)

4) WORK4 (EMPID, EMPNAME, SCHOOL_ATTEND, DEGREE, GRADUATION_DATE)

5) WORK5 (EMPID, EMPNAME, SOCIAL_SECURITY_NUMBER, DEPENDENT_NAME, DEPENDENT_ADDRESS, RELATION_TO_EMP)

(b) What are scripting languages? Display the user name and password of the user using Perl on the same page, using both Get and Post form? **(10)**

## COMPULSORY QUESTION

8. (A) Write only True or False in the Answer Book. Do not reproduce the question. **(1x10)**

1. The terms "type cast" and "type conversion" have different semantics i.e. they have different effects on the program execution.
2. Alignment restrictions of modern RISC-architectures force compilers to occasionally introduce "holes" and "padding" for record structures to ensure efficient access of record elements.
3. In a language with garbage collection, the programmer need not worry about heap memory management.
4. In order to execute a program by interpretive execution, the interpreter needs to execute on the system on which the program is to be run.
5. A GUI is a Graphical Utility Interface.
6. The study of algorithms began in the 1900's when electronic computers began to be used.
7. A bus is a part of the computer that decides if a value should be stored as an integer or floating point.
8. Peripheral devices handle the coordination of a computer's activities.
9. Get method in HTML forms is used for debugging.
10. "pine" is an example of e-mail utility.

(B) Please choose the most appropriate answer from the given set of answers. **(1 X 5)**

11. State Transition Diagram gives information of
    a. Prototype Model b. RAD Model
    c. Spiral Model d. None of these.
12. The concept of meaning represented by an algorithm is known as its:
    a. Control structure b. Sequence
    c. Semantics d. Syntax
13. Each cell of memory is numbered and that number is referred to as the cell's
    a. Block b. Identity
    c. Address d. Size
14. Main memory is called RAM because
    a. It is volatile, like a ram's temper
    b. The computer starts at address 0 and reads every byte until it reaches the correct address.
    c. It can Read All Memory
    d. The memory is accessible randomly
15. To use internet, the computer must have
    a. Telephone b. Modem
    c. ISP Connection d. All of the above

(C) Give short answers to the following questions: **(1 x 5)**

16. Functions of an O.S.
17. Object Oriented Programming
18. Normalization & BCNF
19. Graphs & Trees
20. Server Side Scripting Languages

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